

*Of the Attraction of such Solids as are terminated by Planes ; and of Solids of greatest Attraction. By Thomas Knight, Esq. Communicated by Sir Humphry Davy, LL.D. Sec. R.S. Read March 19, 1812. [Phil. Trans. 1812, p. 247.]*

The attention of most mathematicians who have treated of the attractions of bodies, has been confined to those bounded by continuous surfaces ; and Mr. Knight is not aware that any author, with the exception of Mr. Playfair, has given an example of that kind of inquiry which he here undertakes.

If a solid be bounded by plane surfaces on all sides, whether regular or irregular, he undertakes to determine its action, both in quantity and direction, upon any point placed either within or without the body.

For this purpose, the solid is first conceived to be divided into its most simple forms, of which the action can be determined separately ; and thence the collective force of the aggregate is subsequently ascertained.

The first section treats of the attraction of planes bounded by right lines (whether triangular, quadrangular, or polygonal), on points however situated.

The second section extends the same inquiry, first to pyramids, and then to solids, which may be divided into as many pyramids as there are sides.

And in the third, the attraction of prisms of various forms is investigated.

Having completed this part of the subject, Mr. Knight next applies the formulas he has obtained to find the attraction of certain complex bodies, which, though not bounded by planes, have a natural connexion with the preceding subject, having their sections in one direction of a right-lined figure, though in another direction their sections be in part curvilinear, such as the portion of a cylinder generated by the motion of a segment of a circle parallel to itself, or parabolic cylinder by similar motion of a portion of a parabola.

Under the same head, also, the author includes curvilinear pyramids, or groined solids cut from the preceding cylinders by a transverse motion of a similar or dissimilar curve, so as to have a parallelogram for their base.

¶ In the section which concludes this communication, the author enters into the consideration of solids of greatest attraction ; for though this subject has been already treated of, in part, by Professor Playfair and by Silvabelle, their investigations relate solely to homogeneous solids of revolution ; but Mr. Knight extends the investigation to the attractions of those solids treated of in the preceding sections, not only when the density is homogeneous, but also according to different hypotheses of varying density.